

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/692,465 Confirmation No. 7255
Applicants : BRAD L. NOLL et al.
Filed : October 23, 2003
Title : DOUBLE CHECK VALVE ASSEMBLY
Group Art Unit : 3753
Examiner : Ramesh Krishnamurthy
Customer No. : 28289

DECLARATION UNDER 37 C.F.R. §1.132

Sir:

I, Brad L. Noll, a co-inventor in the above-identified application, hereby declare and state as follows:

1. I graduated from California State University, Chico in 1982 with a Bachelor of Science Degree in Industrial technology.

2. I have over 25 years of professional experience, with almost all of the experience involving some aspect of the Fluid Handling Industry. I am currently the Engineering Manager for Zurn Wilkins Regulator of Paso Robles, California, which is a division of Zurn Industries, LLC. of Erie, Pennsylvania. I have been employed with the company for the past 23 years. Prior to my current position, I was a Construction Design Engineer at the Diablo Canyon Nuclear Power Plant in San Luis Obispo California.

3. Throughout my career I have been, and remain, very active with various professional organizations involving the Fluid Handling Industry, including: American Waterworks Association (AWWA), American Society of Sanitary Engineers (ASSE), International Association of Plumbing and Mechanical Officials (IAPMO), and Foundation

for Cross-Connection Control and Hydraulic Research (FCCC&HR). I currently serve on committees for all of the above organizations.

4. I am the author of "Repair Versus Replace", an article describing the importance of repairing fluid handling products in the plumbing industry. This was the feature article in the American Backflow Prevention Association publication in September 2006. I have also been interviewed on numerous occasions for related publications.

5. I currently am a named inventor on three United States patents (U.S. Patent Nos. 5,913,331; 6,513,543; and 6,581,626), including United States Patent Number 6,581,626 to Noll et al., which has been cited as prior art against the claims of the present invention.

6. I have read and am thoroughly familiar with the contents of the above-identified application, as well as the prior art cited by the Examiner, namely, United States Patent No. 6,581,626 to Noll et al., of which I am a co-inventor, and United States Patent No. 6,679,289 to Sisk.

7. The present invention is directed to a check valve arrangement including a modular fluid casing wherein this modular fluid casing includes a one-piece modular cage and at least one in-line check valve removably housed in the modular cage. The modular cage is a one-piece non-movable construction and, as such, is non-movable both prior to and after placement within the housing. The use of this one-piece cage for housing the at least one in-line check valve provides for easy maintenance and replacement of the at least one check valve with minimal disruption of the flow in a fluid handling installation.

8. Prior art check valve arrangements generally include a main body having two ends. The main body also forms an internal flow cavity that fluidly connects the two ends and houses internal valves. In a typical installation, one end of the main body is connected to a fluid inlet pipe and the other end is connected to a fluid outlet pipe. Fluid

flows from the fluid inlet pipe through the internal flow cavity, is stopped, directed or left unimpeded by the internal valves, and exits through the fluid outlet pipe. Such fluid valves can include backflow prevention valves (i.e., double check and reduced pressure principle valves). These valves have multiple moving parts, such as independently acting internal reciprocating check valves, positioned in the internal flow cavity formed by a main body. The inlet and outlet shut-off valves are typically positioned adjacent opposing ends of the main body. In turn, each shut-off valve is connected, respectively, to the fluid inlet pipe or the fluid outlet pipe. The shut-off valves are required for testing and service of the backflow prevention valve.

9. The repair, inspection, or replacement of these check valves typically requires the flow of fluid to be shut off at the valve inlet and outlet, thus stopping the flow of fluid through the pipe. Access to the valves is typically achieved through one or more access ports or openings. Under certain regulatory codes, the main body which houses the fluid valves cannot be completely removed from the fluid handling system during routine maintenance and inspection of the valves. Therefore, maintenance and inspection of such valves can become difficult when the main body is in a location that is not easily accessible to maintenance personnel.

10. As a solution to this problem, in some fluid handling installations, a bypass line is often used to maintain fluid flow through the system while the other fluid valves are either being repaired or replaced. This bypass line adds additional costs and takes up extra space in the fluid handling installation. In some installations, a minor disruption in the fluid flow may not result in serious adverse consequences downline of the fluid handling installation. Therefore, if the time of repair, replacement, or inspection of a fluid valve can be minimized, the need for an additional bypass line may not be required.

11. The present invention, as embodied by the current claims 1-9, 11-20, and 22-24, is directed to a modular fluid casing for a check valve that provides for easy maintenance and replacement of check valves with minimal disruption of the flow in a fluid handling installation. In particular, the present invention is directed to a modular fluid casing comprising a housing having an inlet end and an outlet end and defining a flow channel therebetween formed by sidewalls and a bottom wall of the housing. The flow channel is in fluid communication with the inlet end and the outlet end. A modular cage is removably secured to the housing. The modular cage has a first open end and a second open end and defines an interior cavity. The modular cage is received within the flow channel of the housing, wherein the interior cavity of the modular cage is in fluid communication with the inlet end and the outlet end and the flow channel of the housing. The modular cage has a one-piece non-movable construction prior to and after placement within the housing. At least one check valve is seated within the interior cavity of the modular cage. The construction of the modular cage 32 of the present invention set forth in claims 1-9, 11-20, and 22-24 is particularly shown in Fig. 3 of the patent application. As taught in the patent application, the modular cage 32 is inserted into housing 16 in a manner illustrated in Fig. 2. Paragraph [0025] of United States Publication No. 2004/0134537, which is the publication of the instant application, discloses that when the modular cage 32 is received within the flow channel 27 of the housing 16, the gaskets 54, 56 are compressed against the exterior surface 42 of the body 38 of the modular cage 32 within the flow channel 26 of the housing 16. Because the length L1 is smaller at the bottom portion 28 of the flow channel 26, the modular cage 32 is held in place by a tight fit between exterior surface 42 of the body 38 of the modular cage 32 and the walls B1 and B2 at the bottom portion 28 of the flow channel 26. As further taught in

the patent application, this configuration of the modular cage 32 and the housing 16 helps to create the wedged arrangement recited in the allowed claims in this case.

12. For the above-detailed reasons, the modular cage for containing the at least one check valve having the particularly claimed one-piece non-movable construction prior to and after placement within the housing, overcomes the deficiencies of the prior art as it allows for easy maintenance and replacement of check valves with minimal disruption of the flow in a fluid handling installation.

13. The teachings of United States Patent Number 6,581,626 to Noll et al. do not address or suggest solutions to the above-detailed problems of maintenance and replacement of check valves with minimal disruption of the flow in a fluid handling installation nor does Noll et al. anticipate each and every feature of the claims. Although Noll et al. teach at least one check valve contained within a housing, Noll et al. fail to teach a one-piece modular cage for containing at least one check valve, let alone a one-piece modular cage which has a non-movable construction prior to and after insertion into the housing. The one-piece non-movable construction of the modular cage 32 of the claimed invention can be contrasted to the two or three valve bodies of Noll et al. In this reference, a first valve body 45, an intermediate valve body 50, and a third valve body 55 may be slideably sealed with one another and compressed such that their combined length is less than the length of the opening 25 of the housing 15. In the compressed state, the valve bodies 45, 50, and 55 may be inserted within the opening 25 and then elongated such that the ends of valve bodies 45 and 55 engage and provide a slideable seal with segments of the housing 15. Noll et al. require that the valve bodies 45, 50, and 55 move relative to each other, i.e., compressed for their insertion into housing 15. If the one-piece non-movable modular cage of the claimed invention was substituted for the two or three valve body configuration of Noll et al., the

invention of Noll et al. would be inoperative. The one-piece non-movable modular cage of the claimed invention, which is non-movable both prior to and after insertion into the housing, may be placed within the housing 15 similar to what is shown in Fig. 3 of Noll et al.; however, there would be no sealing of the one-piece non-movable modular cage of the claimed invention within elements 30 and 35. In Noll et al., the valve bodies 45, 50, and 55 are expanded via spacer 85 which is positioned between the shoulder 75 and the shoulder 80 of the valve bodies to maintain the valve bodies 45, 55 in the elongated position within the housing 15 so as to be sealed within elements 30 and 35. That is, valve body 45 is slideably sealed within the outlet 32 of the first segment 30, the inlet 51 of the intermediate valve body 50 is slideably sealed within the outlet 47 of the first valve body 45 and the second valve body 55 is slideably sealed with the outlet 52 of the intermediate body. The outlet 57 of the second body valve 55 is slideably sealed within the inlet 36 of the segment 35 to attain and maintain the positioning of these elements as represented in Fig. 4 of Noll et al.

14. The teachings of United States Patent No. 6,679,289 to Sisk do not address or suggest solutions to the above-detailed problems of maintenance and replacement of check valves with minimal disruption of the flow in a fluid handling installation. Sisk is relied upon in the Office Action as teaching a fastening system for securing the modular cage to a housing. However, Sisk is directed to a check valve A including a hollow body 1 and a lid assembly 2 fixedly attached to the body 1 by a series of bolts 3. Sisk does not teach or suggest a modular cage and a separate housing. Furthermore, Sisk fails to overcome the deficiencies of Noll et al. Neither Sisk nor Noll et al. teach a modular cage for containing at least one check valve wherein the modular cage is formed of a one-piece construction which is non-movable prior to and after placement within a housing.

15. From my experience at Zurn Industries, LLC., (the patent application assignee), Zurn Industries, Inc. has noticed a significant improvement in terms of maintenance and replacement of check valves with minimal disruption of the flow in a fluid handling installation since the present design has been implemented, as compared to my prior experience with similar products. Repair technicians interviewed have indicated that there is a trend toward replacing current products instead of repairing due to the difficulties experienced in gaining access to internal components. Those same technicians have expressed that they feel the present design allows for quick and easy repair, thus reducing the frequency of complete valve replacement.

16. I declare further that all statements made herein of my own knowledge are true and that all statements made on the information and belief are believed to be true, and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable with fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,



Brad L. Noll

March 26, 2007
Date